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cord with the Rochester resolutions. The remaining resolutions, while not acted upon, were received with favor both in public and in private. It will only be necessary to make a forcible presentation of (1) what constitutes the publication of a species, and (2) the importance of our principle of homonyms, to carry conviction to the Continental botanists. Later conversations at Kew convince us that the English botanists will accede to any reasonable standard that promises uniformity and fixity.

LUCIEN MARCUS UNDERWOOD.

DEPAUW UNIVERSITY, October 10th, 1892.

### Palaeobotany of the Yellow Gravel at Bridgeton, N. J.

BY ARTHUR HOLLICK.

(Abstract from manuscript in preparation for a bulletin of the United States Geological Survey. Read at the meeting of the Club on October 11, 1892.)

A year ago, in the course of an address in memory of the late Dr. John I. Northrop, before the New York Academy of Sciences, I expressed the hope that much of the work which he left unfinished would be completed by others, and not be lost to science. To me subsequently fell the responsibility of preparing a portion of his work for publication, and the results of such preparation form the basis of this paper.

Some ten years ago attention was first called to impressions of fossil leaves, in a more or less incoherent sandstone, occurring in the neighborhood of Bridgeton, N. J. No systematic study of the material was attempted, however, until many years afterwards, when Dr. Northrop took hold of it, and not only studied the specimens thus far collected but added largely to them by personal collection.

Much of the material first obtained was too poor for proper identification, but the later collections contain specimens well preserved, and afford good subjects for study.

The geological aspect of the matter I shall not discuss in this paper—that will be treated elsewhere. In what follows I propose to discuss the botanical facts involved, especially in reference to the efforts which have been made to compare and identify the fossil forms with genera and species now living.

All the material which is available for study and identification consists of leaves and pods, and the medium in which they are preserved is so coarse that much of the finer nervation and dentation is obliterated. Nevertheless, the specimens in general are very satisfactory, and from them the following species and genera have been identified:

*Magnolia acuminata*, L.

*Magnolia glauca*, L.

*Asimina triloba*, (L.), Don.

*Ilex opaca*, Ait.

*Ilex Cassine*, L.

*Amelanchier Canadensis*, (L.), Medic., var. *rotundifolia* (Mx.)  
T. & G.

*Liquidambar Styraciflua*, L. This is represented exclusively by a three-lobed variety. It so closely resembles *L. Europæa*, Al. Br., that I was at first inclined to refer it to that species, but as we have in Mexico a variety of *L. Styraciflua* with three lobes, there seems to be no reason why they should not be considered identical. The significant fact has also been pointed out to me by Dr. N. L. Britton, that young shoots of *L. Styraciflua* often bear three-lobed leaves, thus indicating that the ancestors of our five and seven-lobed species were represented by forms such as those from Bridgeton. If it should be proven that the Mexican variety is worthy of specific rank, then the Bridgeton fossil form should be renamed in conformity with it.

*Nyssa uniflora*, Walt. A number of irregularly and coarsely-toothed or entire leaves, which were at first mistaken for some species of *Quercus*, are evidently to be referred to this species. They appear to show even greater diversity in outline than the living species.

*Nyssa Caroliniana*, Poir.

*Viburnum Bridgetonense*, Britton. One of the most abundant species represented, and one of the first to attract attention. Dr. Britton was the earliest to note its generic relationship with *Viburnum*, and to propose for it the name which is here adopted. A large number of forms are included under this name, and it is probable that several new species, or even genera, might be separated from it. Some indicate relationship to *Vitis*, others to *Populus*, and further comparisons will have to be made before

these points can be settled. In view of the fact that the leaves of *V. dentatum*, L. vary on the same bush, almost as greatly as do these fossils, it would seem as though a conservative attitude would be the safest, leaving to others the responsibility of seeing generic and specific differences in the many leaf-forms represented.

*Leucothoë racemosa*, (L.), A. Gray.

*Clethra alnifolia*, L.

*Cinnamomum*, sp ?

*Laurus*, sp ?

*Persea Borbonia*, (L.) Spreng.

*Ulmus Americana*, L.

*Planera aquatica*, Gmel.

*Ioxylon pomiferum*, Raf.

*Morus*, sp ?

*Hicoria Pecan*, (Marsh), Britton.

*Ostrya Virginica*, (Mill) B.S.P.

*Quercus*, sp ? A number of entire, sparingly-toothed or irregularly-margined leaves have been referred to this genus, which apparently have affinities with *Phellos*, *imbricaria* or *heterophylla*, but, as a rule, the nervation is more or less obscure.

*Castanea*, sp ?

Amongst the remains of uncertain affinities two are very prominent by reason of their abundance. One of these is a large leguminous pod, with a dorsal suture and prominent wing. All attempts thus far made to identify it positively with any North American genus has failed. Its nearest affinities seem to be with *Mesoneuron*, *Pongamia* (*Derris*) or *Lonchocarpus*, but no leaves of either one of these genera have yet been satisfactorily identified. There would be nothing startling in the occurrence of an Eastern Asiatic genus amongst this flora, as *Diospyros* is common to both, and the well known similarity of the two floras at the present day has long been a subject of comment.

The other organism which has not yet been definitely placed is a reed or palm-like blade, with parallel nervation. Only fragments have been found, and these have been compared successively with palms, grasses and sedges, but without satisfactory results. Similar organisms have been described by Lindley and

Hutton under the name *Cyperites* and by Watelet as *Anomolophyllites* and it is possible that one of these names may have to be adopted.

It is to be understood that the above names are somewhat provisional, and may be changed in the light of some further material which yet remains to be figured and studied. No considerable alteration, however, will ensue, although several new species will doubtless be added.

From the above it will be seen that of the species which have been identified nearly all are such as are well known in the latitude of Virginia at the present day. In other words, at the time these leaves were deposited in the sands of Southern New Jersey a flora must have flourished there similar to that of Virginia to-day, demonstrating the existence of a warmer climate than now prevails there. The significance of this fact concerns the geologist more than it does the botanist, but, as a last word, it may not be amiss to say that apparently these fossils represent the most recent extinct flora of which we have any knowledge, and bring us very close to the living flora of to-day.

### Plants Collected at Mt. Ktaadn, Me., August, 1892.

Mt. Ktaadn is not a single peak as some imagine, but a mountain with acres of table lands, broken by slight eminences and depressions. Its top is shaped somewhat like a horseshoe, and from one heel of the shoe around to the other it is perhaps seven or eight miles. This horseshoe encloses a basin of the same shape, which has nearly vertical walls two or three thousand feet high. The basin bears some resemblance to the crater of a volcano, except that it is open on one side, and this peculiar formation gives it an interest greater than that of most other mountains of the same height, which is about one mile. From the toe of the shoe a long ridge runs into the center of the basin, which affords an easier and less dangerous ascent than do the steep sides. There is a small pond near the opening from the basin, fed by little rills from the sides, which during heavy rains become considerable torrents, dashing down the almost perpendicular walls, carrying stones with them in their descent, and wearing gorges into the